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Drought will Increase Nitrate Test Levels

by James Gerwing, Extension Soils Specialist

Nitrate nitrogen soil test levels will be higher due to drought conditions. In addition to the nitrate that was in soil in spring, many fields received fertilizer and accumulated additional nitrate from the breakdown of crop residues and organic matter during the dry season. Very little of this nitrogen is removed by crops during a dry year as compared to an average year (Table 1).

Nitrate soil test levels after a typical season in South Dakota average 40 lb per acre to a 2 foot depth in recropped fields. After some recent wet years, the average went down to 26 lb but after dry years in the late '70's the average was as high as 76 lbs per acre.

The higher soil test levels this fall will mean less fertilizer N will be needed for next years crop. The key is to soil sample for nitrate nitrogen to determine exactly what the $\text{NO}_3\text{-N}$ test is. The test will accurately measure carryover fertilizer N in addition to the other sources of available N in soil used by plants.

Nitrate nitrogen in the top 2 feet of soil is as efficiently used by crops as fertilizer nitrogen. When making nitrogen fertilizer recommendations, the $\text{NO}_3\text{-N}$ soil test level is subtracted from the total N required by the crop. The total nitrogen requirement of some crops can be calculated from Table 2.

Table 1. Nitrogen Removed by Crops

Crop	Nitrogen Content		
	Grain	Straw	Total
	lb/A		
Wheat			
10 bu	16	8	24
25 bu	72	36	108
Corn			
25 bu	23	12	35
100 bu	90	50	140

Table 2. Nitrogen Recommendations using the 2 foot deep $\text{NO}_3\text{-N}$ soil test.

Crop	Nitrogen Required ^{1/}
Wheat	2.4 x yield
Oats	1.3 x yield
Barley	1.5 x yield
Corn	(1.45 x yield) - 20
Sorghum	1.1 x yield

^{1/} Fertilizer nitrogen to apply is equal to the nitrogen requirement minus soil $\text{NO}_3\text{-N}$ to a 2 foot depth.

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